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STEM EDUCATION IN ECO-FARMING SUPPORTED BY ICT AND MOBILE APPLICATIONS

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Abstract. *The presented research focused on developing and testing an innovative interdisciplinary STEM didactic model. The developed didactic model was introduced in the field of eco-farming. To the participants, it offers the possibility for non-formal training, which can take place anywhere and anytime. Participants require some knowledge of STEM subjects (especially chemistry and biology) as well as knowledge of ecology, technology, and engineering, in order to provide answers and solutions to environmental challenges while using knowledge of mathematics (especially combinatorics and statistics) to search for optimal solutions (in our case, a lean business plan). The model was tested in non-formal education settings, based on an interdisciplinary approach and modern technologies, such as monitoring the effectiveness of training using electroencephalography (EEG) and mobile applications. In the presented didactic model, special emphasis was placed on an interdisciplinary STEM approach to environmental protection, ecology, connatural forms of production and sustainable development. The presented research confirms the hypotheses that non-formal education is becoming an increasingly important form of education and training, and that the use of the interdisciplinary didactic model, contemporary technologies, and mobile applications, increases the time and intensity of concentration in learning and thus improves learning effectiveness.*

Keywords: *eco-farming, electroencephalography, environment protection, mobile learning, non-formal education, sustainable development*

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Introduction

In today's society, education is increasingly provided outside educational institutions, in the form of life-long learning, through various forms of non-formal education and training (European Union, 2012). Whether it is education or training, the acquired competences are of crucial importance, since only the ability to solve real life problems represents a competitive advantage (European Union, 2012). The purpose of lifelong forms of education and training is to promote and to train for competitiveness and employability, for increasing competences and mobility of employees, for independently finding market niches and creating opportunities, and, in our case, for raising awareness about the impact of human action on the natural environment (Javni štipendijski, razvojni, invalidski in preživninski sklad Republike Slovenije, 2017). In this way, a system can be established for balancing the existing needs on the labour market, to manage structural disparities, to improve the qualification structure of human resources and to increase mobility and employability, which is the current trend in modern societies (European Union, 2012; Javni štipendijski, razvojni, invalidski in preživninski sklad Republike Slovenije, 2017).

The key advantage of non-formal education is that it can take place anywhere and anytime (Ainswort & Eaton, 2010). It is precisely this kind of mindset that underlies mobile technologies and devices, which can be used for learning anytime and anywhere (Aberšek, 2018, Hlodan, 2010). However, the fundamental question here is whether this kind of education and training has led to the achievement of the set goals. In formal education, it is determined through various well-known forms of evaluation and assessment. But in non-formal education, it is somewhat more difficult.

Mobile education is becoming increasingly topical not only for children and youngsters, but for adults as well. Mobile devices are increasingly used not only among young people but also among adults and the elderly (Fernández-Ardèvol & Ivan, 2016; Gilleard et al., 2015). Research has also

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shown that mobile technologies exert a positive impact on lifelong learning and social inclusion (Arrigo et al., 2013; Denk et al., 2007). The widespread use of mobile technology requires well-functioning mobile connectivity in order for this technology to operate properly, not only in urban areas but also in the countryside (Salemink et al., 2017).

One of the biggest sources of polluters for the environment is food production. Considering this issue, it is important to apply a multidisciplinary approach, taking into account the use of various fertilizers, agricultural production intensity, the degradation of arable land (nutrient depletion), and many other factors. Acceptance of innovation and a positive attitude towards the environment are also very important for efficient agriculture (Mc Fadden & Gorman, 2016). To highlight only one aspect, innovation in terms of digitalisation and the use of mobile technologies can improve farmers' access to data and information, increase production, reduce costs in agriculture and have a positive impact on environmental awareness and sustainable development. Thus, mobile technologies in the developing countries have become a major tool for collecting agricultural information (Aker, 2011). In addition, students of agriculture and farmers can use mobile applications to help contact customers, to search for financial information, to seek advice on environmental protection and the related use of fertilizers, etc. (Aker, 2011, Mittal & Mehar, 2012).

Despite the amount of information that farmers can obtain via mobile phones, they also require knowledge of STEM subjects, especially chemistry and biology, which they should be able to relate to knowledge of ecology, as well as to knowledge of technology and engineering, in order to provide answers and solutions to environmental challenges, which in turn allows them to provide optimal solutions to their problems (Araújo et al., 2019). However, since physical work takes up much of their time and energy, they are often unwilling to engage in long-term trainings because they cannot be absent from the farm for a long time. In spite of strenuous work on the farm, many are motivated for learning and adopting new development trends, but they often lack the time to realize potential ideas. For these reasons, farmers should be offered appropriate non-formal education solutions, which is why it is necessary to develop a didactic model that connects the required different types of knowledge from different areas (such as environmental protection, ecology, sustainable development) concisely and in one place. Content should be target-oriented and accessible anytime and anywhere, as this is the only way to lead farmers to their desired goals and the realization of their ideas in a quick and easy way. There is a huge amount of information, trainings, and tools available on the internet today (a search for the keywords "education and eco-farming" yields 291,000 results on Google), however, few are sufficiently comprehensive, let alone integrated with mobile applications. And it is precisely this kind of *comprehensive* approach to education and to raising awareness about sustainable development and environmental protection, complemented by a mobile application, that is a vital contribution to the international arena, all the more so, because it has been translated into five languages, i.e., English, Slovenian, Bulgarian, Greek and Turkish (Ecofar, 2018).

The presented research focuses on the development of both, an appropriate learning environment (which includes mobile applications), and an appropriate interdisciplinary STEM didactic model, called IDM STEM, which has been adapted for non-formal education in the field of sustainable and organic farming and sustainable forms of production, with intensive environmental protection. The proposed learning environment also includes an online learning platform and mobile applications running on Android and iOS. Empirical research is used to determine the effectiveness of learning, i.e., the time and intensity of concentration while using modern mobile technologies and applications developed for this purpose.

The aim of the presented research was to develop and to evaluate an interdisciplinary didactic model IDM STEM for non-formal education. With this in mind, the three hypotheses were formed namely,

- H1: Non-formal education is becoming an increasingly important form of education and training especially in vocational education and training (VET);
- H2: The use of contemporary technologies and mobile applications significantly improves educational results and awareness in non-formal education, especially in interdisciplinary STEM subjects, such as agriculture;
- H3: The use of contemporary technologies and mobile applications increases the time and intensity of concentration in the process of learning.

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Research Methodology

Designing an Interdisciplinary Didactic Model for Non-Formal Education

Farmers require flexible non-formal education and training in order to acquire the necessary skills as successfully and quickly as possible. This was the reason for developing an innovative didactic model for non-formal education, which, however, – with minor modifications and refinements, – can also be used in formal education settings. The didactic model for training farmers is based on contemporary technologies and mobile applications (Aberšek et al., 2014). The didactic model develops skills, raises environmental awareness and, in turn, promotes new career and employment opportunities on the labour market. It introduces an individualized approach with an active starting point (in the form of pre-test) to analyse the situation at the beginning and to determine the type of skills required by each learner (Figure 1).

This research is concerned with raising individuals' knowledges and awareness about the impact of various agricultural approaches on the environment.

Figure 1
Structure of an Innovative Didactic Model For Training Farmers

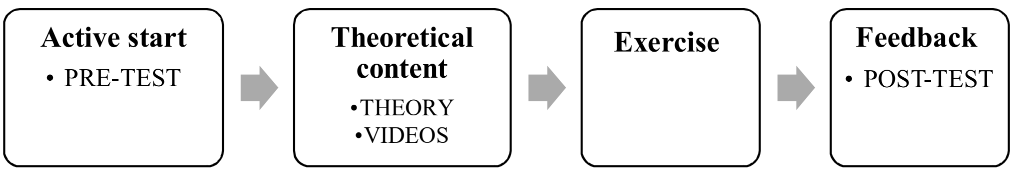
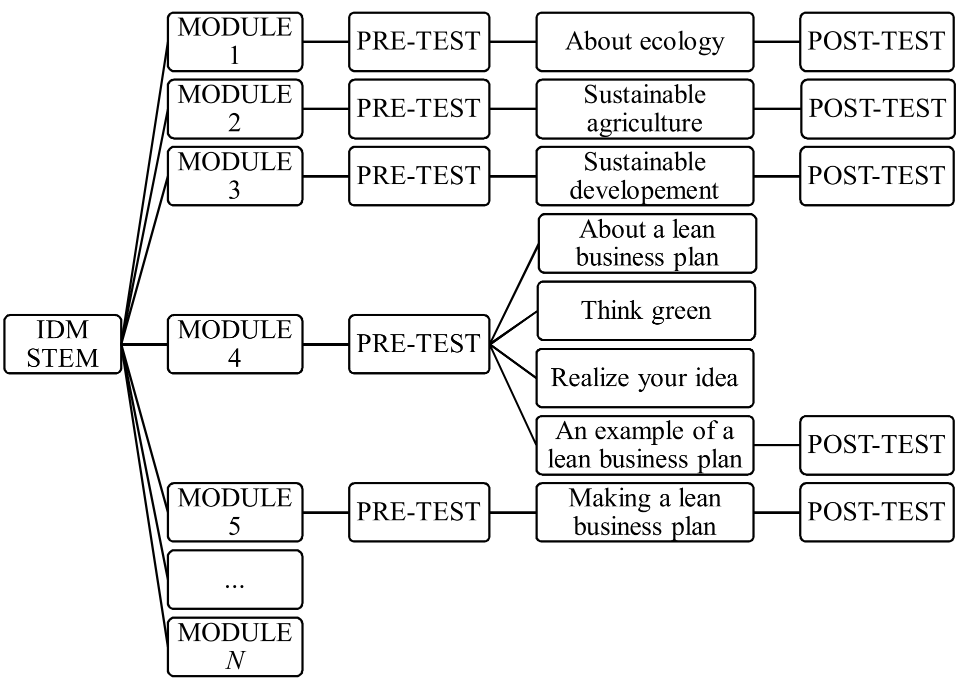


Figure 2
IDM STEM Didactic Model



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A lean business plan (Maurya, 2012) was used as a formative tool in the didactic model (in Module 5, see Apendix), as part of the post-test (Figure 2). This lean business plan has two primary objectives, the first is "think green", and the second is "realize your idea" (creative and critical thinking and environmental awareness). It allowed to test not only the knowledge about "thinking green", but also the awareness and understanding of the matter at an in-depth (subconscious) level of the attitude under research, in the presented case the attitude towards nature protection and sustainability. At the end of the process (after Module 5), farmers receive feedback about the level of their knowledge and/or skills (in the form of a post-test), while the designers and developers of the didactic model receive feedback about the performance of the IDM STEM didactic model, which enables the adaptation of the model to the actual users' needs.

The didactic model was developed and used for the Erasmus+ project Ecofar (Ecofar, 2018). The aim of the project was the development of eco-farmers' ecological knowledges and awareness, management and skills, through a non-formal vocational training mobile app, while enhancing their qualification profile and improving their attitude towards the environment (Ecofar, 2018).

The presented research, therefore, applies a hybrid model of education and training: Module 1 and 5 (live implementation and implementation via mobile applications), and Modules 2-4 (in the form of mobile trainings), in order to determine the success of learning (i.e., performance) through a combination of social sciences' methods (pre-test and post-test surveys) and neuroscientific methods. For the purposes of this research, a survey, a simple electroencephalogram (EEG) from NeuroSky, and the specifically designed NeuroExperimenter Version 6.1.4 software were used in Module 1 and 5 (Katona et al., 2014). In this research, the activities from Module 1 and Module 5 are presented and evaluated. After implementing Module 5, a post-test survey was performed, containing a set of questions and a qualitative assessment of the individual business plans (see Appendix). The business plans contained analyses of the attitude towards nature (think green) and analyses of the business models.

General Background

The aim of the presented research was to develop and to evaluate an interdisciplinary didactic model IDM STEM for non-formal education. In the pilot research, which was conducted in May 2020, future farmers from the Biotechnical School Maribor were included. The whole research was carried out over a period of three weeks; the participants were selected randomly. The presented research describes the live implementation of Module 1 at the beginning of the training, and Module 5 (final evaluation), which was also implemented live. The remaining modules were carried out in the form of distance learning (online).

Sample

Twenty (20) students/future farmers (N = 20) aged between 18 and 20, were included in the pilot research. The average age of participants was 18.65 years. The future farmers were randomly divided into two groups. The limited size of the sample was mainly related to the number of available EEG devices. The first group, the control group (CG), was trained without using the mobile application. In CG, future farmers independently learned about environmental protection. The second group, the experimental group (EG), was trained using an innovative didactic model and applications on a mobile phone, tablets or on different computers.

Only for Module 1 and Module 5, the time and intensity of concentration during learning was measured using an electroencephalogram in CG and EG. There were 10 participants in CG (N_{CG} = 10) and 10 participants in EG (N_{EG} = 10). All participants were familiar with the procedure and signed an "ethical" disclaimer. They were also able to monitor the implementation and results in real time.

Instrument

Web analysis was used to determine the validity of the first hypothesis *H1*. The validity of the second hypothesis *H2* was determined by means of a pre-test and a post-test survey. The validity of the third hypothesis *H3* was determined by means of a pre-test and a post-test by using the EEG.

The pre-test and post-test for Module 1 and Module 5 consisted of two instruments, namely EEG measurements and a survey. The measuring instrument was a Neurosky EEG electroencephalograph and Neuro Experimenter Version 6.1.4 software. The survey contained ten closed-ended questions (four questions on environmental protection,

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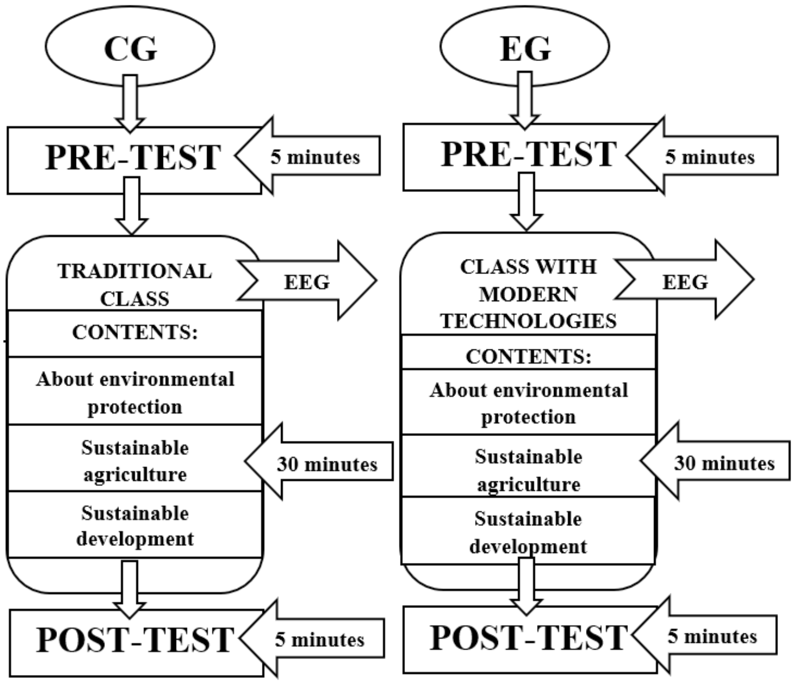
six questions on the realization of ideas and critical thinking on environmental awareness). The objectivity of the pre-test and post-test was ensured by means of clear and unambiguous instructions. The reliability of the part of pre-test was checked by means of Cronbach's alpha coefficient (α = .87). The survey in post-test also included the same ten closed-ended questions. The reliability of the part of the post-test (questioner) was checked by means of Cronbach's alpha coefficient (α = .87).

An EEG device was used in CG and EG to measure brain electrical activity with an electrode attached to the top of the participants' heads. Using the Neuro Experimenter Version 6.1.4 software, the intensity of concentration in CG and EG was monitored throughout the course of the study.

Research Procedure

At the beginning, an EEG device was placed on the heads of participants from CG and EG, which was used to measure the intensity of concentration during the whole Module 1. In the next step, participants from both groups solved a pre-test (paper and pen), which was used to determine whether the groups are equal in term of initial knowledge. The test solving time was five minutes. CG participants then received paper-based learning materials on the topics of STEM, environmental protection, realization of ideas and critical thinking about environmental awareness. At the same time, EG participants used different mobile devices to access the mobile learning platform which contains videos on the same STEM topics, environmental protection, realization of ideas and critical thinking about environmental awareness. Both groups, CG and EG, were given thirty minutes to learn the subject matter and solve the task on realizing ideas and thinking critically about environmental awareness. This was followed by a five-minute post-test for both groups, CG and EG. The post-test was used to determine how much CG and EG participants had learned (Figure 3).

Figure 3
Research Procedure in CG and EG for Module 1



The same procedure was repeated at the end also for Module 5. After the implementation of Module 5, there is going also to be a qualitative assessment of the individual business plans. The business plans are going to analyse the attitude towards nature (think green) and the business models. The qualitative assessment is going to be performed by the teachers involved in the training, with the support of teacher, school psychologists and pedagogues.

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Data Analysis

Various statistical methods were used to analyse the data. Minimum and maximum values, arithmetic mean and standard deviation were used to calculate the results of the pre-test and the post-test, and the time and intensity of concentration during the activities. A *t*-test was used to detect differences in measurements between CG and EG. The obtained data were analysed with the statistical data processing program SPSS 25 for Windows.

Research Results

Results for H1: Initially, an analysis of the existing situation was performed, a search for articles in the Web of Science Education & Educational Research Database. The analysis was performed for the years 2007, 2016 and 2018, counting the number of search results for the keywords "non-formal learning" for each year separately. The years were limited in order to prove that non-formal education is becoming an important form of education and training. The search in 2007 resulted in a list of 20 references, in 2016 resulted in 133 references, and in 2018 in a list of 172 references. It can therefore be concluded that the number of references mentioning non-formal education has increased by more than eight times in the period from 2007 to 2018.

The results were compared to the results obtained by Eurostat (Eurostat, 2019) in an EU survey on the inclusion of adults aged 25 to 64 in non-formal education. Eurostat found that in 2007, 43.7% of adults aged 25 to 64 were included in a form of non-formal education, and in 2016 that share was 60.5% (Eurostat, 2019).

Results for Hypothesis H2: The use of contemporary technologies and mobile applications significantly improves performance in non-formal education, especially in interdisciplinary STEM subjects, such as agriculture are presented in Table 1 and Table 2.

Table 1

t-test Results for Independent Samples of Tested Differences According to Achievements of Future Farmers in CG and EG in the Initial Testing (pre-test)

Group	Minimum (%)	Maximum (%)	X^- (%)	*SD* (%)	*t*	*p*
CG	40.00	70.00	51.00	9.94	-1.234	.146
EG	40.00	70.00	51.00	7.37		

Table 1 shows that there were no statistically significant differences ($p > .005$) between CG and EG compared to the initial test (background knowledge). The obtained average values of the initial tests showed that CG and EG are equal in terms of background knowledge.

Table 2 presents the end results of testing the knowledge of future farmers by means of a post-test.

Table 2

t-test Results for Independent Samples of Tested in CG and EG in the End Testing (post-test)

Group	Minimum (%)	Maximum (%)	X^- (%)	*SD* (%)	*t*	*p*
CG	50.00	80.00	66.00	8.43	-4.382	.001
EG	70.00	90.00	82.00	7.89		

The results of the *t*-test for independent samples of tested differences showed that there was a statistically significant difference between CG and EG ($p < .001$) in terms of end knowledge. The obtained average values of the end tests showed that the EG performed better on the test.

Hypothesis H3: The use of contemporary technologies and mobile applications increases the time and intensity of concentration in the process of learning, which are confirmed in research with EEG measurement. One example (time and intensity of concentration, measured with EEG during the pre-test) is presented at Figure 4.

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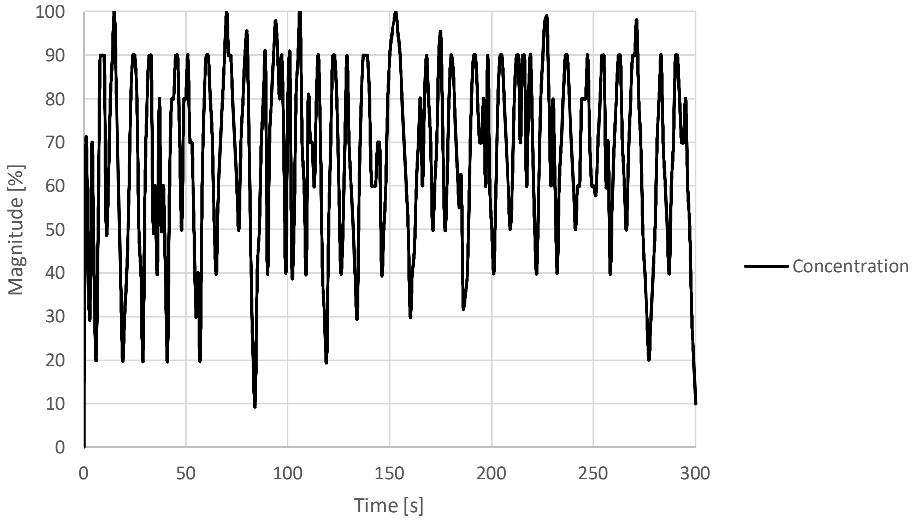
Figure 4
Example of EEG Results



The ordinate shows concentration values, ranging from 0% to 100%, with 0% representing a total absence of concentration, and 100% representing total concentration. The abscissa shows time values. In the example shown, the concentration was monitored for a period of 0 to 300 seconds. With the help of this method, the changes in concentration can be accurately determined throughout the entire training process, and the learning process can be adapted accordingly (Figure 4). More detailed, Table 3 shows the time of concentration of future farmers according to activity (solving the pre-test, solving the post-test, learning about environmental protection, learning about a lean business plan, and creating a lean business plan as part of formative assessment).

Table 3
t-test Results for Independent Samples of Tested Differences according to the Time of Concentration of Participants during the Post-test (pre-test)

Activity	Group	Minimum (min, s)	Maximum (min, s)	X^- (min, s)	*SD* (min, s)	*t*	*p*
Solving the pre-test	CG	4.40	4.51	4.448	0.0397	-4.386	.001
	EG	4.48	4.57	4.513	0.0249		
Learning about environment protection	CG	9.32	9.45	9.374	0.0362	-4.323	.001
	EG	9.39	9.46	9.432	0.0220		
Learning about a lean business plan	CG	9.43	9.54	9.495	0.0371	-3.576	.002
	EG	9.52	9.55	9.538	0.0078		
Creating a lean business plan	CG	9.18	9.51	9.365	0.1088	-4.000	.001
	EG	9.49	9.53	9.504	0.0150		
Solving the post-test	CG	4.48	4.52	4.448	0.0396	-5.446	.001
	EG	4.52	4.57	4.513	0.0249		

Table 3 shows that there are statistically significant differences ($p < .005$) between CG and EG according to solving pre-tests and post-tests, learning about environmental protection and lean business planning, and creating a lean business plan of their own as part of formative assessment, depending on the time of concentration of the participants.

Table 4 shows the intensity of concentration of participants according to activities (solving pre-tests, solving

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post-tests, learning about environmental protection and lean business planning, creating a lean business plan as part of formative assessment).

Table 4
t-test Results for Independent Samples of Tested Differences according to the Intensity of Concentration of Participants during the Post-test (pre-test)

Activity	Group	Minimum (%)	Maximum (%)	X^{-} (%)	*SD* (%)	*t*	*p*
Solving the pre-test	KS	45.00	52.00	49.750	1.9614	-4.220	.001
	EG	50.00	60.57	55.500	3.8369		
Learning about environment protection	KS	44.50	52.00	49.950	2.9575	-4.259	.001
	EG	52.00	59.50	55.100	2.4244		
Learning about a lean business plan	KS	46.50	61.00	51.850	4.4161	-1.476	.157
	EG	50.50	64.00	54.650	4.0623		
Creating a lean business plan	KS	50.25	52.50	51.300	0.8803	-4.238	.001
	EG	52.50	70.50	58.300	5.1488		
Solving the post-test	KS	40.00	52.00	47.900	4.2018	-4.614	.001
	EG	50.00	65.00	58.200	5.6725		

Table 4 shows that there are statistically significant differences ($p < .005$) between CG and EG according to solving pre-tests and post-tests, learning about environmental protection and lean business planning, and creating a lean business plan of their own as part of formative assessment, depending on the intensity of concentration of the participants.

Discussion

The aim of the presented research was to develop and to evaluate an interdisciplinary didactic model. The results of this research showed that differences exist between learning with the help of paper-based materials (CG) and learning via mobile devices as tablets and smart phones using the innovative didactic STEM model (EG). The differences were reflected in the fact that the EG performed better in terms of learning and in terms of the intensity and time of concentration. A similar study recently carried out by Ni et al. (2020) used a NeuroSky EEG device to analyse concentration when using multimedia materials (text, text and graphics, video), and found that participants learning via mobile devices had the highest concentration value. The learners expressed greater attention in text media, but this possibly resulted from the fact that text media had only words that were easy to concentrate; however, the difference did not reach statistical significance. This research took a step further: paper-based teaching materials were added, and statistical differences were proven. Based on the obtained results, all three hypotheses were confirmed. The findings of this research showed that non-formal education is becoming increasingly popular, because in non-formal education setting the forms, methods and time of learning are adapted to the individual (Hozjan, 2010). It is further supported by the fact that the inclusion of adults aged 25 to 64 in non-formal education in 2016 increased by 16.8% compared to 2007 (Eurostat, 2019). In addition, the list of references in the Web of Science (Education & Educational Research) database is growing: the list of references in 2018 increased by 23% compared to 2016. A big leap is observed especially in the period between 2007 and 2016, when the list of references in the database increased by 85%, and then further by 88%, until the end of 2018. It can therefore be concluded that non-formal education is an increasingly important form of education and training, and hypothesis *H1* is confirmed.

T-test results (Table 1) for independent samples of the tested differences showed that there were no statistically significant differences ($p > .005$) between CG and EG with respect to the initial level of knowledge. The obtained average values of the initial testing showed that CG and EG were equal in terms of background knowledge. A statistically significant difference was shown in the *t*-test (Table 2) for independent samples of the

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tested differences between CG and EG ($p < .001$) according to the end knowledge. The obtained average values of the final test showed that EG performed better on average by 16% when engaged in a non-formal education setting (using the interdisciplinary didactic model IDM STEM, supported by contemporary technologies and mobile devices), in comparison to CG, where the traditional way of learning was applied. It can therefore be concluded that the use of contemporary (mobile) technologies significantly improves learning success in non-formal education, especially in complex and interdisciplinary problem areas, such as agriculture and environment protection. This confirms hypothesis H2.

Results (Table 3) also showed that there were statistically significant differences ($p < .005$) between CG and EG according to the time of concentration of participants during the learning process, learning about environmental protection, learning about a lean business plan and creating a lean business plan as part of formative assessment, while motivation was the most important element in this procedure. The focus (concentration) of participants in EG during the pre-test lasted much longer in comparison to CG participants. Students in EG were also more focused than students in CG when learning about environmental protection, learning about lean business planning, creating their own lean business plan as part of formative assessment, and solving the post-test. It needs to be highlighted, however, that the EEG-based research was a pilot attempt, and that further research would be required on a much larger sample, over a longer period of time. The research findings showed that the use of contemporary technologies and mobile applications increased the time of concentration in learning. The IDM STEM interdisciplinary didactic model was designed to encourage concentration and is adapted to the individual; the average concentration time when using this model in all activities was 9 minutes and 47 seconds, which can be compared to the results of similar research in the field of neuroscience (Arana-Llanes et al., 2018; Liu et al., 2013).

Results (Table 4) also showed that there were statistically significant differences ($p < .005$) between CG and EG according to the intensity of concentration of participants during the pre-test and the post-test. Table 4 shows that students in EG were more focused (concentrated) during the pre-test (by 6%), during learning about environmental protection (by 6%), while creating their own lean business plan as part of formative assessment (by 7%) and during the post-test (by 11%). Based on the results, hypothesis *H3* is confirmed. However, it should be noted that this EEG-based research was preliminary, and only provides partial insight into the matter, rather than accurate results. Extensive further research will be required in the future. In addition, original EEG data will have to be analysed (alpha, beta, gamma, delta and theta), allowing for even more accurate experimental data. In spite of everything, there is a positive development trend in this field.

Conclusions

The use of the innovative didactic model STEM in organic farming is an innovation that changes the learning paradigm in the field of STEM. Results of this research show that different combinations of learning sources and methods, coupled with efforts to ensure the effectiveness of the innovative didactic model, have a positive influence on the concentration of eco-farmers. The diversity of teaching methods and knowledge resources is crucial in encouraging the creation of new ideas. In addition, the innovative STEM didactic model is transferable to the practice of organic farmers.

The problem with this type of training, however, is that it requires a completely different didactic approach and completely different learning environments that will allow flexible learning in terms of both time and space. The presented research addressed this problem by means of introducing an innovative didactic model, as well as by means of using modern, ICT-based technologies and mobile applications. The integration of both is an innovation in the field of non-formal education and training, which is becoming a trend in contemporary education.

It is important to place special emphasis on interdisciplinary fields, such as organic farming, which stands at the intersection of food production and environmental protection. Farmers need to receive as much non-formal education (flexible in terms of time and space) as possible, and embrace innovation, especially in the field of environmental protection, since agriculture is one of the biggest polluters of our environment. In a non-formal learning setting, with the help of the interdisciplinary didactic model IDM STEM supported by contemporary technologies and mobile devices, future farmers stayed focused for longer periods of time and achieved better results in comparison to farmers who were learning many years ago in formal education settings. It can be concluded, therefore, that farmers need non-formal education supported by mobile devices, as only such types

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of education will enable farmers (as well as other learners) to learn anytime and anywhere, and to be motivated for education and innovation. The application of such approaches helps raise the awareness of farmers about the ways of modern agriculture and the significance of clean environment and sustainability.

In the process of education, it is extremely important that work methods and learning environments are as effective and user-friendly as possible. While this can be pursued via established sociological approaches in formal education settings, there are less opportunities to do so in non-formal education. Therefore, it is necessary to use various technological tools (such as for example the EEG) already in the development phase, in order to provide feedback about the effectiveness of the developed models and tools in the early phases. A number of problems may appear here. There were a few setbacks encountered during this research, such as the type and number of available EEG devices, lack of existing research in the field of applying EEG devices, sample size and structure of the target groups. There is a plan to expand and elaborate this research in the future. Despite the setbacks, the study shows that the presented didactic model and learning environment was helpful in achieving significant progress in the level of interest and motivation of future farmers, as well as in the quality of acquired knowledge.

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Appendix

The platform used and described in this research is designed with PHP programming language and uses an SQL database. It is available online: https://ecofarm-manager.eu/elearning/?lang=en. The mobile app can be found in the Google Store for Android OS or in the App Store for IOS tablets, and smartphones (name of app is ECOFAR). The user must log on to the platform with a username and password. The platform is user-friendly because it enables the rapid creation of knowledge and competences.

For example, let us look at how farmers can think about different approaches to environmental protection and search for green solutions on mobile devices (Figure A1) in the context of the crumbling of their own business plan. One of the solutions for organic fruit production is shown as an example in Figure A2.

Figure A1
Template for creating a lean business plan (formative assessment) using a mobile device

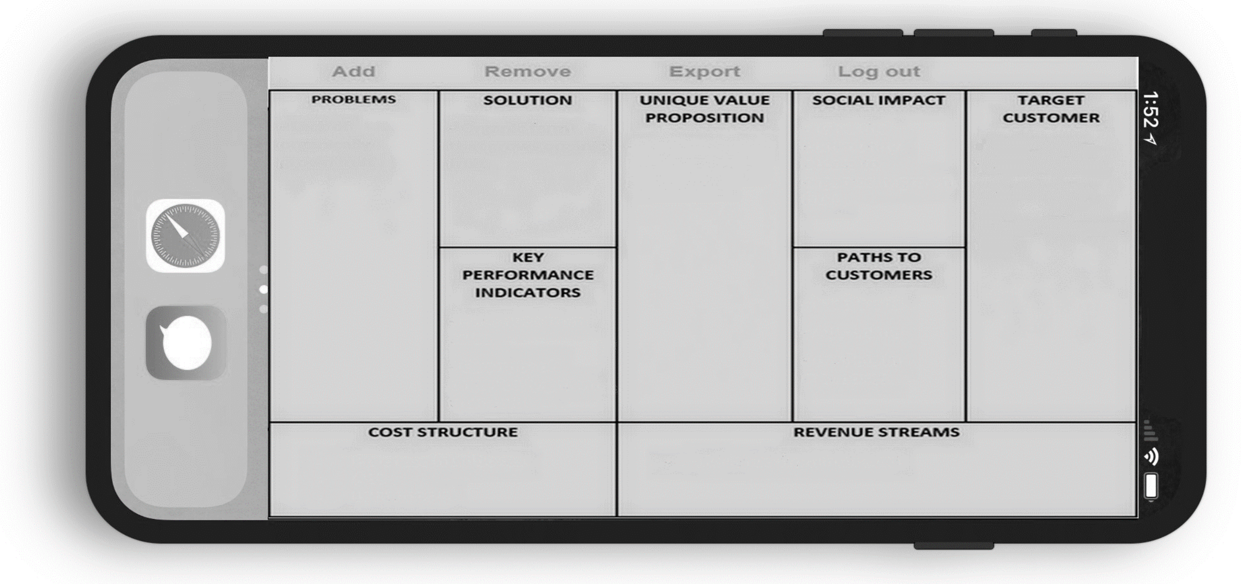

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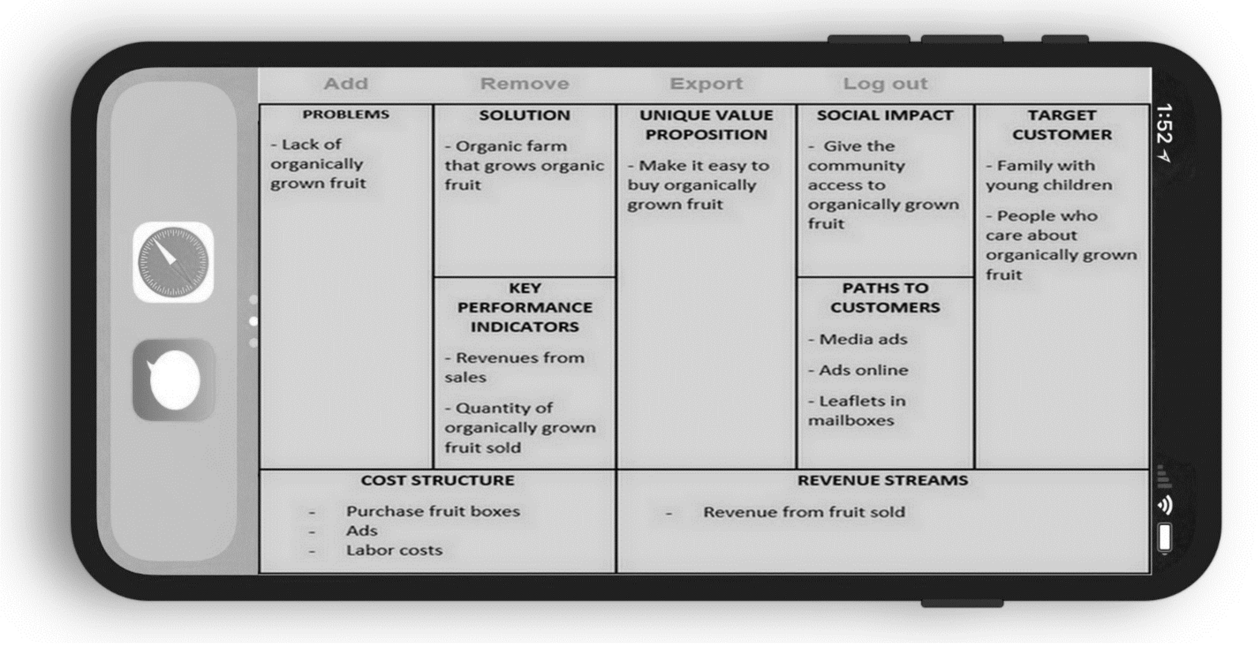
Figure A2
Example of a completed lean business plan for an organic fruit production unit (formative assessment)



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